

**STACKABLE LOW DEPTH BOTTLE CASE  
WITH INTEGRAL SIDEWALL LOGO**

**CROSS-REFERENCE TO RELATED APPLICATIONS**

This application is a continuation-in-part of pending U.S. Application Serial No. 08/421,941, filed April 13, 1995; which is a continuation in part of 1) U.S. Application Serial No. 08/384,331, filed February 1, 1995, pending, which is a continuation-in-part of U.S. Application No. 07/919,376, filed July 29, 1992, pending, and 2) U.S. Application No. 08,268,997, filed June 30, 1994, pending, which is a continuation-in-part of U.S. Application Serial No. 29/018,317, filed February 3, 1994, pending, the entire contents of each hereby being incorporated by reference.

**TECHNICAL FIELD**

The present invention relates to low depth stackable bottle cases for use in retaining and transporting bottles. More particularly, the present invention relates to beverage bottle cases that combine low depth with high stability for stored bottles, full label visibility for display purposes, and an integrally formed logo for easy identification of the bottle or product supplier.

## **BACKGROUND OF THE INVENTION**

Plastic bottles are widely used as containers for retailing soft drinks and other beverages. One type of plastic, polyethylene terephthalate (PET), has become particularly popular because of its transparency, light weight, and low cost. In addition to being flexible, the walls of PET bottles are strong in tension and thus can safely contain the pressure of a carbonated beverage. Moreover, conventional PET bottles can bear surprisingly high compressive loads, provided that the load is directed substantially along an axially symmetric axis of the bottle. A single PET bottle can support the weight of many bottles of the same size filled with beverage if the bottle is standing upright on a flat, horizontal surface and the weight of the other bottles is applied to the closure of the single bottle and is directed substantially vertically along the symmetric axis. However, if a compressive load is applied to a conventional PET beverage bottle along a direction other than the symmetry axis of the bottle, the bottle tends to buckle. This tendency of conventional PET bottles to give way under off-axis compressive loads is particularly pronounced for large capacity bottles, such as the two-liter bottle widely used for marketing soft drinks.

Soft drink bottles are ordinarily packaged by bottlers in cases or other containers, several bottles to the case, for shipment to retailers or for storage. The term "case", "crate" or "tray" is used interchangeably herein to include all cases, crates, trays and similar containers having a bottom and peripheral side wall structure. Cases of bottles are customarily stacked on top of each other. In storage warehouses, columns of cases are frequently stacked on pallets which can be lifted and moved about by fork-lift trucks. The stacks of cases on the pallets

must therefore be particularly stable in order to remain standing in the face of the jostling inherent in being moved about. A technique for interconnecting stacks of empty cases, called "cross-stacking," is often used to improve the stability of empty cases loaded on a warehouse pallet. Cross-stacking generally involves stacking rectangular bottle cases to build up a layered structure, with each layer having cases oriented parallel to each other and with the adjacent layers being oriented at right angles to each other. Thus, since the adjacent layers are perpendicular, each case in the cross-stacked layer rests on at least two cases in the layer below. As a result, the cases of the cross-stacked layer tend to keep the cases on which they rest from moving apart from each other. The cross-stacked layers therefore stabilize the stacked structure.

Because of the tendency of conventional PET beverage bottles to buckle under off-axis loads, attempts to stack cases of these bottles give rise to serious problems. Bottles can tilt away from vertical alignment upon stacking if conventional partitioned cases having low side walls are used to contain the bottles. Tilted bottles in the lower cases of a stack can buckle and give way, causing the stack to fall. Even absent buckling, the tendency of bottles to tilt in conventional low-sided cases causes problems. Tilting generally places an undesirably low limit on the number of tiers in a stack since the tilting of bottles in one case can cause the next higher case in the stack to tilt. This leads to instability if too many tiers are included in the stack.

Previously, these problems were dealt with by packaging beverage bottles in corrugated-paper cartons having high sides, often equal in height to the height of the bottles. Two-liter PET bottles filled with soft drinks were often packaged

in enclosed corrugated paper cartons for storage and shipment. Although the high sides of these paper cartons reduce the incidence of tilting and provide additional support when the cartons are stacked, the cartons are expensive. The cost of the cartons cannot ordinarily be distributed over a number of repeated uses since corrugated-paper cartons generally are not rugged enough for reuse and therefore they are usually discarded by the retailer. The cartons also do not generally provide viewing of the products there within and, thus, even the cartons loaded with bottles are not easily identifiable with a particular soft drink bottler.

One solution to the problems of full depth corrugated-paper cartons is plastic full depth cases; that is, plastic cases having peripheral sidewalls approximately the same height as the bottles. In plastic full depth cases, the sidewalls are the load bearing surfaces. Full depth plastic cases, however, have numerous disadvantages. They are expensive to manufacture, they are expensive to ship and to store empty in a warehouse as they require a large amount of space. Full depth cases also totally surround the bottles and prevent display of the bottles and are not easily identifiable with a particular product or supplier, except by the imprinted or painted logos or other insignia that may be applied thereto.

To overcome these problems plastic low depth cases have been used. A low depth case is one in which the side walls are lower than the height of the stored bottles, and in which the bottles support the weight of additional cases stacked on top. The commonly assigned U.S. Patent Nos. 4,899,874 and 4,978,002, the contents of which are hereby incorporated by reference, disclose a low depth bottle case for two-liter bottles that is cross-stackable when empty if the upper cross-stacked cases are properly positioned. In addition, in the

embodiment disclosed the substantially flat upper surface across the bottle retaining pockets permits one piece petaloid bottles and bottles with base indentations to be retained. The low height of the case sidewalls and the columns above the case sidewalls also allow the display of the bottle labels to the consumer. The side walls, however, are generally rectangular and do not identify the particular supplier of the soft drink, except by imprinted or painted logos or insignias that may be provided.

### **SUMMARY OF THE INVENTION**

These and other problems of the prior art are overcome by the stackable low depth case of the present invention. The stackable low depth case for retaining and transporting bottles has opposing side walls and opposing end walls that form an outer shell having a case bottom disposed substantially within the outer shell. The side walls include a lower wall portion and a plurality of spaced upwardly projecting pylons, four corner pylons defining four corners of the case. A plurality of spaced upwardly projecting columns generally disposed within the outer shell define, in combination with the case bottom, the side walls and the end walls, a plurality of bottle retaining pockets. The columns and the pylons extend above the lower wall portions and below a top surface of the retained bottles. At least one of the walls includes an integrally molded logo which identifies the source of the goods.

Various additional advantages and features of novelty which characterize the invention are further pointed out in the claims that follow. However, for a better understanding of the invention and its advantages, reference should be made

to the accompanying drawings and descriptive matter which illustrate and describe preferred embodiments of the invention.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is a top perspective view of a stackable low depth case according to the present invention;

Figure 2 is a side elevational view thereof;

Figure 3 is an end elevational view thereof;

Figure 4 is a top plan view thereof;

Figure 5 is a bottom plan view thereof; and

Figure 6 is a bottom perspective view thereof.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

As shown in Figures 1-6, the stackable low depth bottle case 10 has two basic elements: a floor structure 20 and a wall structure 11. Wall structure 11 includes four side walls 12, 14, 16, 18. Side walls 12, 16 are relatively long and extend the length of case 10 whereas side walls or end walls 14, 18 are relatively short and extend the width of case 10. As discussed further below, side walls 12 and 16 define a logo or insignia to identify the supplier of the bottled product or the case itself. The depth or height of side walls 12, 14, 16, 18 is relatively low compared to the height of the bottles retained therein. The ratio of the length of long side walls 12, 16 to the length of short end walls 14, 18 is substantially equal to the ratio of the number of bottles the case holds in the lengthwise direction to the number of bottles the case holds in the widthwise direction. For example, an 8-bottle case is approximately twice as long as it is wide and holds bottles in a 4 x 2 relationship. This length to width relationship will be discussed further below.

As best shown in Figure 1-3, case 10 also includes a floor structure or bottom portion 20 attached to side walls 12, 14, 16, 18 to form the outer shell of case 10. Preferably, case 10 is made from plastic and is molded integrally as a single component. Bottom portion 20 has an upper surface 22 and a lower surface 24. Upper surface 22 is substantially flat in order to accommodate a variety of bottles, including one piece petaloid bottles and two piece base cup bottles. Lower surface 24 is formed as a plurality of closure acceptance areas 25 defined by generally concave concentric circular portions 26, each having a central retaining opening 28 disposed therein as shown in Figure 5. The number of closure acceptance areas corresponds to the number of bottles the case is designed to retain. In addition, the periphery of bottom portion is finished with a beveled edge 35 to facilitate handling by allowing hand trucks to slide easily under the case.

The closure acceptance areas 25 of lower surface 24, shown clearly in Figures 5 and 6, allow cases 10 filled with bottles to be vertically stacked for transportation, storage, and display purposes. Circular concave portions 26 are formed offset from the centerline of the retained bottles by ribs or projections which define the circular concave shape. These ribs also form central retaining opening 28. Central retaining opening 28 is sized to receive the bottle top of a bottle which is disposed in a lower case 10. The bottle top fits adjacent central retaining opening 28 so that central retaining opening 28 retains the bottle top in position against lower surface 24. The conical shape of circular concave portion 26 assists the bottle top to abut central retaining opening 28. When an upper case 10 is being positioned on loaded lower case 10, often bottle tops will not precisely line up with respective central retaining openings 28. However, the bottle tops

will contact the offset circular concave portions 26 and, because of the concave shape, be guided into central retaining openings 28. In the preferred embodiment of the invention, as illustrated, a cloverleaf closure acceptance area 25 is utilized to ensure that there is contact around the entire perimeter of the closure acceptance area. The cloverleaf closure acceptance area 25 substantially restrains the end-to-end movement as well as the side-to-side movement of the bottles in the stacked cases. Thus, even though the center-to-center distances between adjacent bottle retaining pockets are not substantially equal between adjacent cases, the use of offset concentric circles and a cloverleaf shaped closure acceptance area enables the cases to be column stacked or cross-stacked in a stable pallet load.

Side walls 12, 16 each include a lower wall portion 56 and a plurality of pylons 58. It will be understood in the present invention that "pylon" denotes an upwardly extending hollow column or post. In addition to the side wall pylons 58, a corner pylon 58a is disposed in each corner of case 10. Pylons 58, 58a are integrally formed with lower wall portion 56 and floor structure 20. Pylons 58, 58a are preferably hollow and generally extend upward from and beyond a top edge of lower wall portion 56. Pylons 58, 58a are integral with the interior and exterior lower wall portion 60, 62. Interior lower wall portion 60 and exterior lower wall portion 62 combine to provide a double-walled construction to case 10 such that they are respectively contiguous with the interior and exterior surfaces of the side and corner pylons. This construction ensures that case 10 will have sufficient strength and rigidity for a variety of handling situations.

In a preferred embodiment, the interior lower wall portion 60 of sidewalls 12, 16 is defined by a plurality of retaining tabs 74 extending upwards from



bottom portion 20. The exterior lower wall portion 62 of side walls 12, 16 is defined by an integrally formed logo 76 or insignia which identifies the company. The company may be the bottler, the product within the bottle, the manufacturer of case 10 or any other company having an interest in being identified with the bottle case, the bottles or the product. "Logo" as used herein should be broadly interpreted to mean any geometric pattern, alphanumeric or written pattern, symbol, emblem, design, trademark or other identifier of the company or source of the goods, such as industry symbols, company mascots, company names, and the like. The integral logo 76 as defined herein forms a structural component of the bottle case having an upper logo edge 78 and a lower logo edge 80, as differentiated from a logo which is merely embossed or molded onto a wall of the bottle case. The interior and exterior lower wall portions may both be used to define the integral logo, or just the exterior.

In a preferred embodiment, the lower edges 82 of end walls 14, 18 on opposing sides of handle portion 64 are at approximately the same height relative to bottom portion 20. As a result, the lower edge 80 of logo 76 adjacent end wall 14 is also at approximately the same height as lower edge 80 of logo 76 adjacent end wall 18. This symmetric lower edge configuration assists in the utilization of case 10 of the present invention with automated machinery such as case palletization equipment. Similarly, although not related to this purpose, it is also preferred for the illustrated embodiment that the upper edges 84 of end walls 14, 18 on opposing sides of handle portion 64 be at approximately the same height, and that as a result the upper edge 78 of logo 76 adjacent end wall 14 is also at approximately the same height as upper edge 78 of logo 76 adjacent end wall 18.

A plurality of vertical walls 29 and columns 30 are disposed within side walls 12, 14, 16, 18. For clarity of the present invention, "columns" denote an upwardly extending hollow column or post within the interior area of the case and "pylon" denotes the same around the periphery of the case. In a preferred embodiment, vertical walls 29 extend to the top surface of bottom portion 20. The side edges of vertical walls 29 abut pylons 58 and columns 30 and help to secure the interior surfaces of pylons 58 and columns 30 to bottom portion 20. Vertical walls 29, columns 30, and pylons 58, 58a, when combined with upper surface 22 of bottom portion 20 and sidewalls 12, 14, 16, 18, (including retaining tabs 74) define a plurality of bottle retaining pockets 32. Columns 30 and pylons 58, 58a extend above bottom portion 20 a distance approximately equal to forty percent of the height of the bottles to be retained in case 10. For example, where cases 10 are shaped to retain lightweight 2-liter bottles, columns 30 and pylons 58, 58a define a case that is approximately 5.25 inches tall. This increases the effective height of the case while maintaining high bottle visibility and low manufacturing costs. In addition, since the columns and pylons increase the lateral stability of the bottle within bottle retaining pocket 32, a greater variance in the diameters of the bottles is obtained because as snug of fit is no longer necessary, as in the prior art cases.

Pylons 58 are disposed along the walls 12, 16 and columns 30 are disposed away from the walls, centrally within bottom portion 20. Pylons 58a disposed in the corners between two adjacent walls have one curved surface 34. Pylons 58 disposed on sidewalls 12, 16 have two curved surfaces 34 and one flat surface 36 disposed therebetween. The two curved surfaces 34 help define two separate and

adjacent bottle retaining pockets 32. Flat surface 36 is disposed between these two bottle retaining pockets. Columns 30 that are disposed centrally within bottle portion 20 are octagonally shaped. These columns 30 have four alternating curved surfaces 34 and four alternating flat surfaces 36. The four curved surfaces 34 define portions of four bottle retaining pockets 32 and the four flat surfaces 34 separate these pockets. Four curved surfaces 34 on four separate columns 30 or pylons 58 form the four corners of interior bottle retaining pocket 32. Exterior bottle retaining pockets formed by corner pylons 58a, side pylons 58, and columns 30 are defined by only three corners since there are no side pylons on end walls 14, 18, the reasons for which are discussed below.

As shown in Figure 1, column 30 and pylons 58 disposed along a center line 40 of the length of the case 10 (along the transverse axis of case 10) include recesses 42, 44, respectively, which for the disclosed embodiments extend downwardly to a height which substantially equals the height of vertical walls 29. Columns 30 disposed along a center line 46 of the width of the case (along the longitudinal axis of case 10) also include recesses 48 which extend downwardly to a height substantially equal to the height of vertical walls 29. Further, columns 30 and pylons 58 disposed along an axis parallel to center line 40 along the transverse axis of the case include recesses 52, 54, respectively. Depending upon the particular logo of the sidewalls 12, 16, the recesses 44, 54 in pylons 58 may not all be equal. In the disclosed embodiment, for example, pylon 58(b) is disposed above the higher side of lower wall 56 and is therefore shorter than adjacent pylons 58. The recess in pylon 58(b) is therefore also shorter than the recesses in the adjacent pylons. As discussed below, these recesses are for

receiving ribs of an identical upper case and provide flexibility in the stacking of identical cases.

The upper surface 22 of bottom portion 20 within bottle retaining pockets 32 is substantially flat. This permits retention of bottles regardless of the configuration of the bottom of the bottles. Also, this allows petaloid bottles to be rotated within the bottle retaining pockets to facilitate display of the product. The low depth feature of case 10 as well as the windows or depressions 38 cut out from side walls 12, 16 further enhance display of the product labels in a retail setting.

In prior art cases, the center-to-center distances between adjacent bottle retaining pockets has generally been equal. Thus, the symmetrical and conical shape of the circular portions aligned the bottle tops with the central retaining openings, regardless of whether the cases were column stacked or cross-stacked. In the present invention, however, the positioning of handle portions 64 disrupts the equality of center-to-center distances between adjacent end bottle retaining pockets in adjacent cases with abutting side walls.

Bottom portion 20 also includes a plurality of ribs 70 corresponding in location to recesses 42, 44, 48, 52, 54 within columns 30 and pylons 58 and extending upwards from lower surface 24 to the bottom of the recesses. The correspondence between the ribs and the column and pylon recesses enables case 10 to be column nested one on top of another, as described in detail in parent application U.S. Serial No. 08/421,941. This is also accomplished by having pylons 58, 58a and columns 30 which are angled toward the interior of the case. This means that pylons 58, 58a and columns 30 are tapered so that the cross

sections at their tops are smaller than their cross sections nearer the lower wall portion. Pylons 58, 58a are also set slightly inward from the height of lower wall portions 56 to further enhance the nestability of empty cases. When case 10 of the present invention is nested, the interior surface 86 of corner pylons 58a, as best shown in FIG. 6, rests upon the upper surface of the corner pylon therebeneath in the identical lower case. In the illustrated embodiment, the lower edge 80 of integral logo 76 of an upper nested case will be spaced slightly above the upper edge of the integral logo of the identical lower case.

End walls 14, 18 are formed by handle portions 64 to facilitate carrying case 10. Preferably for 2 liter cases, the upper surfaces of handle portions 64 are equal in height to corner pylons 58a, which are equal in height to pylons 58 and columns 30. Handles 64 extend integrally from corner pylons 58a, and comprise substantially horizontal handle bars 66 integral with handle supports 68 which extend angularly inward from the corner pylons. Handle supports 68 of each handle 64 diverge from handle bar 66 such that the handle has a generally trapezoidal configuration with the handle bar defining the short side of a trapezoid and the supports defining the diverging legs.

Handle portions 64 can be utilized to lift case 10 in the usual manner by grasping the upper edge with the palm facing upwards and the fingers curling upwards and into the case. This manner of lifting is damaging to the wrists, however, when delivery personnel are lifting a case from above their head. Therefore, the present invention also allows handle portions 64 to be gripped with the palm facing down and the fingers curling downwards around handle bar 66. There are no pylons or vertical walls on end walls 14, 18 in the area immediately

interior to handle bar 66 in order to assure that there is adequate space for the fingers to be inserted and curled therearound. As most clearly shown in Figures 1 and 6, the upwardly extending end wall member 72 is terminated below the height of vertical walls 29 in order to not interfere with the handle performance yet still restrain the movement of the loaded bottles. In a further embodiment of the invention, handle portions 64 may also have finger recesses along the upper edge and/or lower edge to further aid in carrying case 10. Still further, handle portions 64 or an alternate handle configuration may be provided on side walls 12 and 16 in addition to end walls 14 and 18 such that a gripping structure is disposed on each side of the case.

Although described in detail with respect to the preferred embodiment having a plurality of columns and pylons, it should be clear to one skilled in the art that the integral logo 76 of the present invention can be used in any type of case or tray for transporting containers. It also not necessary for the integral logo 76 to be disposed in the lower wall portion of the case since it could easily be configured for placement anywhere within the wall structure of the case. That is, the logo could be formed along a top band or rim of a case when the side walls of the case are defined only by downwardly extending columns with large spaces therebetween, such as the cases illustrated in U.S. Patent No. 5,267,649 or other similar designs.

Numerous characteristics, advantages, and embodiments of the invention have been described in detail in the foregoing description with reference to the accompanying drawings. However, the disclosure is illustrative only and the invention is not limited to the precise illustrated embodiments. Various changes

and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention.

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